

## **REMARKS**

### **I. Overview**

The Applicant has reviewed and considered the Office Action dated February 5, 2008 and the references cited therewith. Claims 30 and 44 have been amended. Additional claims 45 and 46 have been added. Support for these amendments and additional claims may be found throughout the specification, for example, in the published specification at paragraphs 8, 102, 107, and 117, and Figures 4-5. No new matter has been added. Claims 42 and 43 have been canceled, claims 30, 35, 38-41 and 44 are under examination in the instant application. Upon entry of the foregoing amendments, claims 30, 35, 38-41, and 44-46 are pending in the instant application. Applicants respectfully request that this Amendment After Final be entered and made of record. The present response is an earnest effort to place all claims in proper form for immediate allowance. Reconsideration and passage to issuance is therefore respectfully requested.

### **II. Claim Objections**

A. Claim 42 stands objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 30 is directed to a solution having pH from about 4.0 to about 7.5, whereas the dependent claim is directed to water. The Examiner writes it is important to note that water can have a pH of more than 7.5. The Examiner writes, for example, tap water has pH of 8.0. Claim 30 allegedly fails the infringement test because claim 42 would conceivably be infringed by water would not infringe claim 30. See MPEP § 608.01(n).

While not acquiescing to the Examiner's arguments, Applicant has canceled claim 42 in order to expedite prosecution. In light of the foregoing, Applicant submits that the rejection to claim 42 under 35 U.S.C. §112 is moot.

B. Claim 29 stands objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant believes that this objection is erroneous as the claim was previously canceled. If the Examiner intended to refer to another claim, Applicant looks to the Examiner for specific comments in this regard.

### **III. Claim Rejections Under 35 U.S.C. § 112**

A. Claims 30 and 35 remain rejected and newly added claims 38-44 stand rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for a solution having pH of 4.5 to 5.5, and comprising an isolated group 2/3 pollen allergen of SEQ ID NO:2 (Lol p 3) with β-expansin activity in the solution to expand monocot cell walls, allegedly does not reasonably provide enablement for a solution (a) comprising any group 2/3 pollen allergen and (b) having pH from about 4.0 to about 7.5.

Applicants respectfully disagree. One of skill in the art would be able to make and use the present invention without undue experimentation using well known techniques available prior to the priority filing date of the present application.

The Examiner writes it is important to note that the recitation "pH about 4.0 to about 7.5" encompasses pH values above 4.0 or 7.5 and would encompass a pH at which the instantly claimed solution would not exhibit plant cell wall expansion activity. Applicant respectfully points out that enablement does not require that all encompassed embodiments be operative.

This is simply not the law. The law is whether one skilled in the art can identify operative embodiments without engaging in undue experimentation. MPEP § 2164.06. "The test is not merely quantitative, since a considerable amount of experimentation is possible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." (In re Wands, 8 U.S.P.Q.2d 1400 (Fed. Cir. 1988).

Therefore, for example, as shown in Figure 8, while extension or expansin activity for group 2/3 allergens may decrease as the pH of the solution approaches the edges of the pH range, it does not mean that the activity is non-existent or insignificant. Nonetheless, while not acquiescing to the Examiner's arguments, Applicant has amended claims 30 and 44 to recite a pH from about 4.5 to about 6.

Furthermore, the Examiner states that the specification lacks guidance on a solution that would be useful for cell wall expansion comprising a group 2/3 pollen allergen having expansin activity (other than SEQ ID NO:2) and wherein the pH is in the range of about 4.0 to about 7.5.

Applicant submits that the Examiner has ignored the declaration submitted November 12, 2007 and specification's teachings, in particular of Figure 8, and has failed to provide a reason to doubt the enablement of the claims as required under MPEP § 2164.04. The rejection fails to satisfy this standard as the arguments raised in the Office Action do not establish that group 2/3 allergens lack beta-expansin activity at the claimed pH range of about 4.5 to about 6, nor do they refute Applicants' position that those skilled in the art are capable of identifying and isolating additional polynucleotides encoding group 2/3 allergens having beta-expansin activity at the claimed pH range with a reasonable expectation of success. Indeed, as shown in the declaration submitted November 12, 2007, an additional group 2/3 allergen, a novel maize group 2/3

allergen, was identified and isolated using standard techniques, and  $\beta$ -expansin activity was determined using cell wall extension assays performed at a pH about 6. As noted in the previous response, the novel maize group 2/3 allergen differs in amino acid sequence from the Lol p 3 and Phl p 2/3 described in the specification at Figure 4. Taken together, the identification and isolation of these proteins and the results from the cell wall extension assays demonstrate that, consistent with the specification, additional group 2/3 allergens having  $\beta$ -expansin activity at a pH within the claimed pH range of about 4.5 to about 6 can be easily identified. Accordingly, the data in the declaration demonstrates that one of skill in the art, relying on the present disclosure, and on knowledge in the art at the time the present application was filed, would be able to identify additional group 2/3 allergens with  $\beta$ -expansin activity within the claimed pH range of the present invention. Applicant has provided at least 3 examples of such allergens and the Examiner has failed to provide a reason to doubt that the disclosure is not enabling for the claims. For example, the Office Action does not provide an explanation to doubt that while beta-expansin activity may decrease as the pH of solution approaches the edges of the claimed pH range, it does not mean that the activity is non-existent or insignificant. Importantly, Applicant's are not claiming a specific level of beta-expansin activity.

In light of the above, Applicant submits that claims 30, 35, 38-41 and 44-46 are fully enabling and commensurate in scope with the disclosure of the claimed invention. Therefore, Applicant requests that the rejection under 35 USC §112 be reconsidered and withdrawn. Applicant respectfully submits that the claims are in form for allowance.

**B.** Claims 42-43 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. The Examiner writes the claims

contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Examiner writes claim 42 recites "water solution" which introduces NEW MATTER into amended claims. The Examiner writes the specification does not provide written description support for "water solution" comprising the limitations of claim 30. The Examiner writes it is important to note that water can have a pH of more than 7.5, for example, tap water has pH of 8.0 and this does not comply with written description requirements.

The Examiner writes claim 43 recite "pH of said solution has been adjusted with acetic acid" which introduces NEW MATTER into amended claims. The Examiner writes the specification does not provide written description support for "pH of said solution has been adjusted with acetic acid" and this does not comply with written description requirements.

While not acquiescing to the Examiner's arguments, Applicant has canceled claims 42 and 43 in order to expedite prosecution. In light of the foregoing, Applicant submits that the rejection to claims 42 and 43 under 35 U.S.C. §112 is moot.

#### **IV. Claim Rejections Under 35 U.S.C. § 103**

Claims 30, 35 remain, and newly added claims 38-44 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Cosgrove (Nature, 407:321-326, Published September 21, 2000, Applicant's IDS) in view of McQueen-Mason et al. (Plant Physiol., 107:87-10, 1995, Applicant's IDS) and Ansari et al. (Biochemistry, 28:8665-8670, 1989). This rejection has been necessitated due to the claim amendment filed in the paper of November 12, 2007.

Applicant respectfully traverses this rejection. Applicant respectfully submits that the Office Action did not make out a *prima facie* case of obviousness because the Office Action failed to provide a reason to combine the cited references and, even if there was a reason to combine them, they teach away from Applicant's claimed invention. See M.P.E.P. § 2141.02. As an initial matter, claims 30 and 44 have been amended to recite in part, "an isolated group 2/3 pollen allergen having β-expansin activity in solution and wherein said solution has a pH of from about 4.5 to about 6." Support for these amendments may be found throughout the specification, for example, in the published specification at paragraph 107. No new matter has been added.

The Examiner writes that Cosgrove teaches a solution having pH 4.5, and comprising plant cells (e.g. cucumber cells) and beta-expansins and further teaches using said solution in studying plant cell wall expansion (p. 322, figure 1; paragraph bridging p. 322 and 323). Office Action, at page 7.

Applicant respectfully points out that the solution in Cosgrove (at Figure 1, page 322) concerns a solution having alpha-expansins rather than beta-expansins. See page 322, first full paragraph, and references cited therein, including the McQueen-Mason et al. article cited by the Examiner under this 103 rejection. Accordingly, the Office Action at page 8, the McQueen-Mason et al. reference uses a solution having pH 4.5, and comprises plant cells (cucumber cells) and expansins to study plant cell wall expansion (p. 87, abstract; p. 89, materials and methods; p. 91, figures 2-3; p. 93). Again, the cited reference discloses the study of alpha-expansins, not beta-expansins. Importantly, beta-expansins are inactive on cucumber hypocotyl cell walls. See, for example, Applicant's published specification, at paragraph 102 and Figure 4A. Rather, the group 2/3 allergens, unlike alpha-expansins, induce extension of plant cell walls from monocots, e.g. maize silks. Furthermore, the Office Action incorrectly states that Cosgrove teaches a group

2 pollen allergen having  $\beta$ -expansin activity (p. 325, left column, line 2-29). This passage merely states with respect to a group-2 allergen that, "...a potential function in wall loosening is suggested by its homology to expansin" and that "the expansin was examined for endoglucanase activity". (Cosgrove, page 325, left column, lines 2-29). This passage does not purport to assign beta-expansin activity to the group 2/3 allergen. Thus, contrary to the Examiner's conclusion the references do not show that "beta-expansins showed higher activities under acidic conditions of pH 4.5". Office Action, at page 9. Therefore, the Examiner's conclusion lacks basis.

Therefore, contrary to the Examiner's conclusion, it does not follow that it would have been obvious for one of ordinary skill in the art to replace expansins of the solution taught by Cosgrove or McQueen-Mason et al. with a group 2/3 pollen allergen of Ansari et al. and adjust the pH of the solution to pH 4.5 to obtain plant cell wall expansion of grass cell walls and arrive at the instantly claimed invention with reasonable expectation of success. The references do not support a conclusion that a group 2/3 allergen is an obvious substitute for an alpha-expansin since the shared homology is a mere 20%, and importantly, group 2/3 allergens act on different cell wall polymers at a different pH range than alpha-expansins. For example, the group 2/3 allergen, Lol p 3, has an optimum pH between 4.5 and 6, whereas alpha- and beta-expansins have optimum activity at pH 3-4 and pH 5-6 respectively. Applicant's published specification, at paragraph 107. Alpha-expansins participate in the "acid growth" process in plants, wherein plant cell enlargement and wall loosening are stimulated by low cell wall pH. Applicant's published specification, at paragraph 103. Furthermore, "[b]ecause of its pH dependence, Lol p 3 is not a good candidate as an acid-growth agent. Instead, its pH dependence is centered on the normal pH of the cell wall." Applicant's published specification, at paragraph 103. Therefore, it is by no means obvious what pH range or substrate specificity would be associated with the group 2/3

allergen activity and none of the references would point one of ordinary skill in the art to the claimed solution as taught by Applicants.

Accordingly, the Office Action has failed to provide convincing evidence of obviousness as required under *KSR Int'l Co. v. Teleflex, Inc.*, 82 USPQ2d 1385, 1396 (2007). As the Supreme Court has recently articulated in *KSR Int'l Co. v. Teleflex, Inc.*, 82 USPQ2d 1385, 1396 (2007), it can be "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. The Supreme Court only found obviousness to be present after "convincing evidence" of obviousness was provided. *Id.* at 1400. Therefore, the Office Action has provided no such convincing evidence or line of reasoning, and therefore the rejection should be withdrawn.

Furthermore, a person of ordinary skill, upon reading the cited references would be led in a direction divergent from the path the Applicant took. *In re Gurley*, 27 F.3d 551, 31 USPQ 2d 1130, 1131 (Fed. Cir. 1994); *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966); *In re Sponnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969); *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (C.C.P.A. 1963). Upon reading the cited references, one of ordinary skill would prepare a solution appropriate for the extension of dicot cell walls using alpha-expansions, rather than arriving at Applicant's solution having a pH from about 4.5-6 and a group 2/3 allergen that is suitable for extending monocot (grass) plant cell walls.

Thus, the cited references teach away from the claimed invention because group 2/3 allergens of the β-expansin subfamily have activity at a different pH range and act on different cell wall polymers than the alpha-expansins. Furthermore, Applicant has shown that group 2/3 allergens have selectivity for monocot (grass) cell wall extension, whereas alpha-expansins show

selectivity for dicot cell wall extension. Applicant's published specification, at paragraphs 8, 102, and 117, Figures 4-5.

For at least the reasons in the preceding paragraphs, one of ordinary skill in the art at the time of invention would not have had any motivation to combine the prior art elements in the manner claimed, much less have had a reasonable expectation in advance that a group 2/3 allergen belonging to the beta-expansin subfamily would have activity in a solution with a pH from 4.5 to 6. Thus, claims 30, 35, 38-41 and 44 are not obvious for at least the reasons argued above. Additional claims 45-46 are believed to be patentable over the cited references for at least the reasons set forth above. In light of the foregoing, Applicant requests that the rejection to claims 30, 35, 38-41 and 44 under 35 U.S.C. §103 be reconsidered and withdrawn. Applicant submits that the claims are in form for allowance.

## **V. Conclusion**

In conclusion, Applicant submits in light of the above remarks, the claims are in a condition for allowance, and reconsideration is respectfully requested. If it is felt that it would aid in prosecution, the Examiner is invited to contact the undersigned at the number indicated to discuss any outstanding issues.

No fees or extensions of time are believed to be due in connection with this amendment; however, consider this a request for any extension inadvertently omitted or excess claim fees, and charge any additional fees to Deposit Account No. 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,



HEIDI S. NEBEL, Reg. No. 37,719  
McKEE, VOORHEES & SEASE, P.L.C.  
801 Grand Avenue, Suite 3200  
Des Moines, Iowa 50309-2721  
Phone No: (515) 288-3667  
Fax No: (515) 288-1338  
**CUSTOMER NO: 27407**

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Attorneys of Record